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Exploration of the Patterns of Physical Education Teachers' Participation within Self-Directed Online Professional Development

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ABSTRACT

Although physical education (PE) teachers have increased access to digital/online continuous professional development (CPD) activities, there are few robust accounts of how they engage with and experience these environments. ***Purpose***: The purpose of this study was to examine PE teachers' participation patterns within self-directed online PE-CPD activities using mobile instant messenger (MIM). ***Methods:*** Data were generated from (a) 5,246 messages exchanged in the MIM chatroom from 281 teachers, (b) semi-structured interviews with 10 teachers, and (c) 1,275 messages posted by the 10 interviewed teachers. Quantitative data were analyzed for measures of central tendency, and qualitative data were analyzed inductively. ***Findings:*** Five patterns of PE teachers' uses of MIM were identified: (a) ringmasters, (b) passive uploaders, (c) active uploaders, (d) requesters, and (e) bystanders. ***Discussion:*** The findings suggest that each engagement pattern illustrates the differential goals of learning, types of interaction, and forms of participation by teachers engaged in online CPD.

Key words: mobile instant messenger, digital, participation patterns, professional learning

There is extensive international evidence that Continuous Professional Development (CPD) is a key mechanism for teachers to learn and develop their practices so as to meet the complex needs of young people today (Darling-Hammond, Hyler, & Gardner, 2017; Groundwater-Smith, 2017; Vangrieken et al., 2017). Ensuring that teachers have access to effective CPD is therefore vital for the growth of teachers and students (Cordingly et al., 2015; Darling-Hammond et al., 2017). Evidence suggests that CPD is most likely to support practitioner learning when it is content-focused, incorporates active learning, supports collaboration, uses models of effective practice, provides coaching and expert support, offers feedback and reflection, and is of a sustained duration (Cordingly et al., 2015; Darling-Hammond et al., 2017). Studies conducted in the area of physical education(PE) also echo these characteristics that effective CPD is on-going and sustained (Parker, Patton, & Tannehill, 2012), includes extended learning opportunites within community (O'Sullivan & Deglau, 2002), and promotes active and collaborative learning (Armour & Makopoulo, 2012; Atencio, Jess, & Dewar, 2012). Characteristics of effective professional development also include concepts of agency and capacity building, whereby adult learners are prompted, encouraged and supported to critically evaluate evidence, inquire into their practices, and develop new insights that are aligned with the needs of their own contexts (Cordingly et al., 2015, Vangrieken et al., 2017). Teacher communities are thereby a powerful context for professional development (c.f. Vangrieken et al., 2017) that can be supported and developed in online and digital spaces (Greenhow & Lewin, 2016; Marcia & Garcia, 2016).

A growing body of literature in PE and sport pedagogy recognizes online environments as important contexts for CPD (see Cushion & Townsend, 2018; Gleddie et al., 2016; Goodyear, Casey, & Kirk, 2014; Goodyear, Parker, & Casey, 2019; Harvey & Hyndman, 2018). It has been reported that social media, blogs, and web-based chats overcome some of the cost and time deterrents to engagement with CPD, and that online environments provide ongoing professional support and new opportunities for teachers to

engage with the latest evidence-based practices (Calderón, MacPhail, & Meroño, 2019). Calderon et al., 2019; Goodyear et al., 2019; 2014; Harvey & Hyndman, 2018). Nonetheless, the body of evidence on online PE-CPD is limited and contradictory. In particular, there is very limited robust research explaining how and why teachers engage with online PE-CPD or identifying relationships and/or causal links between online PE-CPD, teacher learning, and/or impacts on practice (Cushion & Townsend, 2018; Harvey & Hyndman, 2018). Much uncertainty therefore remains about the effectiveness of online environments for PE-CPD and how teachers should engage with online CPD to support their learning and practices.

This study contributes to knowledge about effective PE-CPD by offering new and in-depth insights into South Korean PE teachers' engagement with a self-directed online PE-CPD environment. The specific and original focus is on understanding teachers' online interactions and the different ways in which they engage with self-directed online CPD. A typology of teacher participation in online PE-CPD that explains how different forms of teacher participation shaped engagement is presented. A rigorous mixed methods case study design was utilized to explore 684 teachers' differential levels of engagement with a specific online PE chat group on Kakao Talk, a mobile instant messenger (MIM) medium, where teachers were able to exchange messages in a closed online forum. New data offer insights into the potential benefits and limitations of online and self-directed PE-CPD. Evidence from this study has the potential to inform the development of new ways of facilitating, investigating, and evaluating self-directed online PE-CPD, information that will be relevant to researchers, policy makers, CPD providers (online and offline), schools, and teachers. The research question addressed in this study was, what are South Korean PE teachers' participation patterns within self-directed online PE-CPD activities using MIM?

Teachers' Differential Engagement with CPD

It is well established that teachers have different learning needs, and will engage with CPD in different ways and to different intensities. For example, Goodyear (2017) demonstrated that

six teachers in the same PE department had very different learning experiences from the same year-long CPD program delivered in their school and online via social media. Most studies to date that examine online CPD, however, have failed to account for the varying ways in which teachers participate in online environments (see Carpenter & Krutka, 2014; Harvey & Hyndman, 2018). Data have been collected predominantly from surveys, which do not provide sufficient evidence on the varied, multi-layered, complex, and dynamic ways in which individuals participate in online environments (Greenhow & Lewin, 2016) and in CPD (see de Vries, Jansen, & Grift, 2013; Goodyear, 2017; Yoon & Armour, 2017). To better understand how contemporary teachers' learning and practices can be supported in optimal ways, new and in-depth insights are required into the different ways in which different teachers participate in self-directed online PE-CPD environments (Goodyear et al., 2019; Harvey & Hyndman, 2018).

Similar to the analysis of teacher professional learning communities on social media by Goodyear et al. (2019), the framework for the landscape of professional learning communities (PLCs) developed by Parker, Patton, and Tannehill (2012) and MacPhail, Patton, Parker, and Tannehill (2014) provided a conceptual map to guide an analysis of how different teachers participate in online CPD. This category-based framework, which is grounded in situated learning theory, identifies different forms of PLCs that are created from the practices of different participants who together shape the characteristics of particular learning environments. Depending on five cirtical characteristics of success, guideposts, faciliators, roadblocks, and potential, the PLCs have been categorized as collection of teachers, established groups, and communities of practice.

Notably, in the account given by Lave and Wenger (1991) of legitimate peripheral participation in situated learning, two key groups of individuals within a group were identified: newcomers and old-timers. These individuals learn the shared routines and

practices of a community through their participation within it, while their new and/or old/traditional practices shape the shared practices of the collective community as it evolves.

To understand how different teachers engage with online CPD, Parker et al. (2012) and MacPhail et al. (2014) suggested that we should consider the practices that exist within different online groups or communities, and whether there are specific individuals who exhibit particular practices. Hence, and building on the application of the framework by Goodyear et al. (2019) to investigate a social media PLC, the professional learning landscape was applied in the present study to interpret the different types of practices of teachers within the MIM. For example, the framework guided an analysis of whether there were internal leaders within the MIM, and/or which participants were involved in the acquisition of new ideas. In the discussion, the framework is further explored to illustrate how the data analysis process allows one to expand on the characteristics inherent within the PLC framework for cases when online mediums are considered in relation to CPD.

Methods

Research Design

A case study design was adopted to provide a contextually grounded, holistic, and detailed account (Hodge & Sharp, 2016) of South Korean PE teachers' participation within a self-directed online PE-CPD community. In South Korea PE is a compulsory subject for children and young people between the ages 9-16. A teacher competency evaluation system and mandates for CPD also exist making the CPD participation rates for South Korean teachers higher than the aveage for Organization for Economic Cooperation and Development (OECD) countries (c.f. Lee et al., 2019). For example, following four years of employment, all PE teachers are mandated to undertake 90 hours of formal CPD provided by the local education office to progress in their professional grading. In addition, the Korean government provides each teacher with $220 for CPD per year. As has been reported elsewhere (c.f. Lee et al., 2019), PE-CPD tends to be institution-based and sport skills focused, where engagement is

influenced by teaching experience. In sum, there is a strong emphasis on accountability and teacher quality within a formalized CPD policy, and thus a case study design was appropriate to provide an in-depth analysis into the specific South Korean PE-CPD context.

The case was defined at the level of a Kakao Talk chatroom that included 684 Korean PE teachers at the time of the study. Kakao Talk provides not only the chat feature, through which users can exchange text, but also a range of other functions, such as photo and video sharing and group discussion. PE teachers in South Korea have been utilizing Kakao Talk as an unofficial and voluntary CPD tool for the past decade (Lee, Choi, Son, & Lee, 2018). A Kakao Talk chatroom was therefore selected as an appropriate case study to examine South Korean teachers' participation in self-directed online PE-CPD, with the case study focus considered to be transferable to other teachers' usage of online mediums for CPD in different international contexts.

Ethics

The research protocol was reviewed and approved by the institutional review board of the first author's university. Data collection procedures and methods aimed to ensure participants' safety, privacy, and dignity while promoting their autonomy. Passive consent was sought from all members of the PE Kakao Talk chat group. Similar to other Internet research studies (see McKee & Porter, 2009), passive consent was obtained by posting a message in the group notifying teacher participants that the chat group was part of a research study. Participant teachers were notified that the messages posted in the group from January 2017 to December 2017 would be analyzed for research purposes. The passive consent information also stated that the messages posted by teacher participants would not be individually quoted, and that only general quantitative trends and overall patterns were to be analyzed. Furthermore, the passive consent message informed teachers that if they did not want their data to be included in the research they should individually contact the lead researcher by clicking the link that was provided in the message, which led the user to an online form. None of the teacher

participants refused to participate in the study. To generate in-depth insights into the chat community, active informed consent was sought from 10 teacher participants who were selected by the researchers for interviews. These selected teachers participated in interviews and provided consent to collect, analyze, and report on their messages within Kako Talk. Legal conditions were followed for exporting data from the chat group. Pseudonyms have been used in the reporting of the findings.

Participants and Data Sources

At the time of this study (2017), Kakao Talk had 684 PE teacher users. Data were collected between January 2017 and December 2017. The data collection took place in three phases, with an iterative design used to ensure the rigor and generalizability of participants' reported experiences of Kakao Talk.

The purpose of Phase 1 was to understand the general pattern and trends of teacher participation within Kakao Talk by analyzing the messaging behavior of all members. During the 12 months of data collection, 5,246 messages were posted and subsequently exported for analysis.

The purpose of Phase 2 was to understand the different ways in which teachers participated in Kakao Talk and the teachers' perceived value of participation in MIMs for online PE-CPD. For Phase 2, a purposeful sampling strategy was adopted to select 10 teachers for interview. The sampling criteria were based on balancing gender, academic degree, participation styles in Kakao Talk (as identified in Phase 1), and teaching experience. Despite the differences in the number of teachers among five different participation styles, an equal number of participants (n=2) was selected from each group to represent balanced perspectives among the 10 participants. Although the vast majority of teachers were either bystanders or requesters, the average number of messages posted by individual teachers within these two groups (bystanders and requesters) was much lower than those identifying as ringmasters and uploaders, which provided rationale for selecting equal number from each

participation style. The gender and teaching experience distribution of selected teachers were similar to the overall distribution of chatroom participants.

The background information of the 10 participants selected to be interviewed is shown in Table 1. The activities the teachers conducted in the MIMs, the materials exchanged in the MIMs, and the advantages and disadvantages of using MIMs for CPD were discussed during the semi-structured interviews. The face-to-face interview took approximately one hour per participant. It also were recorded and transcribed verbatim.

Place Table 1 About Here

The purpose of Phase 3 was to better understand the content of the messages that the 10 teacher participants shared in the MIM chatroom. In addition to the interviews, the content of the messages exchanged in the MIM chatroom by the 10 teachers were analyzed. A total of 1,275 messages were posted by the 10 teachers. The messages were then exported as text and analyzed for content and characteristics.

Data Analysis

The MIM messages and in-depth interviews were analyzed through inductive categorical analysis (Corbin & Strauss, 2008). First, the chatroom messages were retrieved as text and entered into the NVivo program. Descriptive analysis was conducted regarding the function (e.g., encouraging, sharing) of messages. The analysis of the function of the messages revealed the styles of each teacher's participation in the chatroom. Five different patterns of participation emerged through text analysis, and the number of teachers identifying with each participation style and the number of messages posted by each participation style group were counted for the general trend analysis.

Second, the transcribed interview data from the 10 selected teacher participants were repeatedly read while separately marking meaningful words and sentences. Initial codes were

created based on repeated words and keywords, then compared with each other to categorize them into groups with the same attributes for focused coding. The appropriateness of the classification was checked based on the similarity between the codes through consultation between the researchers, and the analytic memos taken to reflect on the concepts. In addition, all messages posted by the 10 teachers who participated in the interviews were exported as text, and the content, format of exchanged material, and function of the messages were analyzed and counted to reveal specific trends. Overall, through this analysis process five themes and five participation styles were identified. These are reported in the findings section, and they are theorized in relation to PLCs in the discussion.

Validity

A relativist approach was applied to guide validity of the data anlaysis process and to extend the robustness of traditional measures of quality, such as trustworthiness (Smith & McGannon, 2018). In this study, therefore, a list of characterizing traits were selected by the research team to guide validity, rigor, credibility, and coherence. The validity was guided by the originality and significance of the topic, and the rigor was checked in relation to the breadth of the dataset, collected from different sources and diverse participants. The credibility was guided through the analytical process being undertaken by multiple researchers from diverse disciplinary and international contexts, which strengthened the generalizability and transferability of the research findings. Finally, the coherence was checked through the alignment between aims, methods, and outcomes, and in relation to the appropriate definition and critical engagement with theory (i.e., PLCs and situated learning).

Findings

Five themes were identified and thus five different ways in which the teachers participated in Kakao Talk: (a) ringmasters, (b) active uploaders, (c) passive uploaders, (d) requesters, and (e) bystanders. Table 2 outlines these different types of participation and explains their characteristics. Among the 684 teacher participants in Kakao Talk at the time of the study,

most were categorized as bystanders (n = 403; 58.9%), followed by requesters (n = 170; 23.9%), passive uploaders (n = 56; 8.2%), active uploaders (n = 53; 7.7%), and ringmasters (n = 2; 0.3%). However, the majority of messages were posted by uploaders, followed by requesters and ringmasters, with no visible traces from bystanders (see Table 2).

Place Table 2 About Here

Ringmasters

Ringmasters are the teacher participants who created and managed the MIM chat on Kakao Talk. This category of teacher participants was the smallest of the five participant groups, which included only two participants (0.3%). These teachers were identified as leaders and "experts" in PE.

In terms of leadership skills, there was evidence that Kakao MIM chat was created by the ringmasters to enhance teacher learning: "I made the chatroom using Kakao Talk because I wished communications and sharing among teachers to occur more quickly and actively" (Interview, T1, male, 43 years old). The ringmasters' knowledge and status were reported to be influential in terms of encouraging other teachers to engage with the MIM chat. According to one participant interviewd,

> There should be no PE teacher who does not know him. He appeared in TV programs on the subject of PE and published physical education textbooks. I think that hundreds of persons participate in the Kakao Talk because he created the chatroom. (Interview, T7, Female, 24 years old)

The ringmasters also played a key role in facilitating dialogue among the teacher participants. Despite there being very few teachers in the ringmaster category, these teachers accounted for 7.8% (n = 409) of all messages exchanged during the academic year. The ringmasters' messages were primarily focused on managing interactions and discussions, and

maintaining an appropriate code of conduct for online interactions. For example, the ringmasters aimed to protect the confidentiality of the teacher participants (e.g., "Please do not post material including personal information"—Message from T2) while also encouraging the teacher participants to share resources (e.g., "Teachers, please do not hesitate to share the class materials. Through your courage, our community grows"—Message from T1). Through these interactions, the ringmasters played a key role in formulating the ongoing interactional dynamic of MIM chat.

Active Uploaders

Active uploaders refer to the teacher participants who uploaded materials voluntarily and without requests from other teacher participants. This category included 53 teacher participants (7.8%), who sent 2,402 messages during the data collection period, accounting for 45.8% of the messages exchanged. Data collected from the interviews identified that the active uploader teacher participants were driven to share their resources to support other teachers' learning and practices. A major advantage of the chat was that it could overcome some of the drawbacks of accessing resources shared in offline CPD workshops. For example, an active uploader teacher observed,

> Every time I go to the workshop, I see a long line of teachers with USBs who want to download material presented in the session. Like, can I download it with my USB? That is why I post my material in this chatroom to quench their thirst for material quick and easy. (Interview, T3, female, 42 years old)

The active uploader teacher participants uploaded a range of different content in the form of materials to Kakao Talk (see Table 2). Most of the material shared was related to lesson content, for example, tactical gameplay suggestions and teaching materials to support dance-based activities. The materials were posted at appropriate times for annual school events. For example, "teachers, here comes the athletic event season! Please refer to attached documents for organizing a tournament" (Message from T4). Although there were advantages

to the active uploaders sharing resources, at times, this caused some teacher participants to feel overwhelmed with the vast amount of resources. In some cases, participants considered leaving the chat group because of the constant sharing of content. For example, “sometimes one person indiscriminately sends dozens of materials at a time. Honestly, who would read them? Only reminders keep ringing. At such times, I really feel like leaving the Kakao Talk chatroom” (Interview, T9, male, 41 years old).

In summary, the active uploader teacher participants posted material without being asked by others, and this provided a foundation for the MIM chatroom resource bank. Despite good intentions, unidirectional posts made by active uploaders were sometimes perceived by others as frustrating due to the challenges of navigating vast amounts of content.

Passive Uploaders

Passive uploaders refer to the teacher participants who uploaded materials when requested by another participant. This category comprised 56 teacher participants (8.2%; see Table 2). These participants sent 1,731 messages, which accounted for 33% of the messages exchanged during the data collection period. These teacher participants perceived that they could only be a member of the Kakao Talk if they uploaded materials. For example,

> I did not have my presence in the Kakao Talk, where hundreds of people were active. I came to think that I became a member of this chatroom only after I uploaded materials and I began to actively participate thereafter. (Interview, T5, male, 31 years old)

Uploading resources or ideas did not occur immediately. The teacher participants reported that they needed to observe what other materials had been uploaded to overcome feelings associated with shame or embarrassment. For example,

> I wrote a long message about a question related to the student athletic club. But I could not press the “send message” button. I was ashamed of the fact that others would read my message as I am not smart and I was embarrassed without reason.

(Interview, T5, male, 31 years old)

Before I upload my material, I compare it with others' materials. When others' materials seem better, I give up bravely. Why should I upload it when it will make me feel ashamed? (Interview, T6, male, 32 years old)

In addition to sharing materials, the teachers in the passive uploader category mediated conversations between teacher participants. The passive uploader teacher participants identified and introduced teacher participants to share relevant expertise. For example, when a teacher shared difficulty in teaching physical expression activities, a passive uploader posted a message such as, "teacher Kim is an expert in expressive activities. If you need help, I can connect you to him" (Message from T5). In this way, passive uploader teacher participants bridged requesters and expert teachers. In addition, when teachers shared an issue of student resistance or disengagement issue, the passive uploader teacher provided encouragement such as, "you should have been much distressed. However, you should not lose your courage and take heart until the end" (Message from T6).

Overall, the passive uploader teacher participants played a key role in contributing to the developing practices of the chat group through sharing materials and offering support to other teacher participants.

Requesters

Requesters refer to the teacher participants who asked questions and requested materials from other participants of Kakao Talk. This category included 170 teacher participants (24.9%), who shared 704 messages (13.4%) during the data collection period. The requester teacher participants sought out a range of different information from Kakao Talk teacher participants. Similar to the active uploaders, most of the material requested related to lesson content and administrative tasks.

The requester teacher participants reported that a key advantage of the Kakao Talk community was the accessibility of information. In particular, it was reported that information

could be obtained immediately. For example,

> I think I came to rely on the community further because information has been provided more quickly than when I asked my fellow teacher at the same school. In some cases, it takes really less than 10 seconds for a question to be answered. (Interview, T7, female, 24 years old)

Besides the accessibility of information, requesters believed that the quality of information provided in the chatroom would be trustworthy because it was being constantly cross-checked by other chatroom members. For example,

> I am sure that the information posted here will be high quality because people can't share material in a chatroom with hundreds of teachers without confidence. There will be always someone who is smarter and let us know when it is incorrect. (Interview, T8, male, 36 years old)

Although the accessibility of information was valued, some of the teacher participants were concerned about their visibility and presence in Kakao Talk. Concerns were noted that others could see their questions. For example,

> When I ask a question, more than 600 teachers see my question at the same time. I am afraid that my weakness may be revealed in this chatroom. So every time I post a question, I check whether it is appropriate or not. It's kind of self-censorship. (Interview, T7, female, 24 years old)

Overall, the requesters contributed to the maintenance of the community by promoting the sharing of information and resources. The requesters were attracted to the online environment because they could obtain rapid responses and reliable information from multiple people.

Bystanders

Bystanders refer to the teacher participants who did not post any messages to Kakao Talk. This teacher category consisted of 403 (58.9%) teacher participants. Bystanders stayed

in the chatroom due to a sense of belonging and psychological safety arising from connectedness with other teachers. For example, “I think I feel some psychological stability just from the fact that I belong to this space together with physical education teachers all over the country (Interview, T9, male, 41 years old). Another teacher also said, “I cannot easily leave the room. Many physical education teachers are gathered there, who may be helpful someday. It is insurance” (Interview, T10, female, 25 years old).

Regarding their reasons for staying invisible in the Kakao Talk chatroom, bystander teachers indicated that the size of the chatroom, shyness, and minimizing interruption by avoiding duplicate messages led them to remain silent. For example, “It is the biggest chatroom among PE teachers. Just imagining the message I posted is shared with hundreds of teachers made me overwhelmed. It is different with small-scale chatrooms. Plus I am an introverted person” (Interview, T9, male, 41 years old). Similarily, another bystander observed,

> I don’t feel the need to post messages because most of the information I need is already there. There is always someone who either requests or provides material that I need. If I post a message, it will be redundant and interrupt other people. (Interview, T10, female, 25 years old)

Although they left no visible traces of activities in the chatroom, bystander teachers searched for and retrieved relevant information from the chatroom and spread the material to other teachers in offline contexts. They even invited other teachers to the chatroom, as they recognized the benefits of participating. For example,

> I tried to download material as much as possible because it can be useful someday. Sometimes, I pass around the material obtained from chatroom to my colleagues as needed. In addition, I invited many of my juniors to join. When I told them that just looking at the materials exchanged should be greatly helpful for them in adapting to school life as newly appointed teachers, all of them were pleased. (Interview, T10,

female, 25 years old)

In summary, bystanders used the chatroom to obtain a sense of belonging and stay up to date on the latest information without posting any messages. The bystander teacher participants shared the information they had obtained from the chatroom with other teachers offline**.** It shows that bystander teachers are engaged in MIM chatroom in a strategic way to meet their needs yet play a role for the maintenace of the chatroom by inviting other teachers and spreading information.

Discussion

The purpose of this study was to examine PE teachers' participation patterns within self-directed online PE-CPD activities using mobile instant messenger (MIM). From gathering data on teachers' perspectives and their online interactions, five engagement patterns were identified: ringmasters, active uploaders, passive uploaders, requesters, and bystanders. Each engagement pattern illustrates the different goals of learning, types of interaction, and forms of participation within the chatroom, which ranged from individual enrichment to community building, and from being a recipient to being a major contributor. Although there were different levels of engagement, as indicated by the frequency of messages posted in the chatroom, each group of teachers played unique roles in the sustainable development of the mobile chatroom group by, for example, leading discussions, sharing resources, requesting and responding to messages, and promoting the group to other teachers and/or inviting other teachers to the online group. The key challenge for the development, organization, and facilitation of online self-directed PE-CPD is therefore to ensure that online environments are designed and developed in ways that promote and support teachers' varying purposes in joining the group, diverse learning needs, and online engagement patterns.

Overall, the data illustrated how PE teachers' participation in self-directed online PE-CPD was influenced by technological and professional factors. The technological affordance of MIM helped teachers exchange multimedia resources, including text, documents, music,

and video clips, without the limitations of time and place that are often reported as barriers to engaging in professional development in offline contexts (Armour, Quennerstedt, Chambers, & Makopoulou, 2017). Unlike offline formal CPD, participants controlled their degree of participation because both autonomy and anonymity were supported by the features and structure of the MIM chatroom (Blitz, 2013; Tang & Hew 2019). Furthermore, the data reported in this study indicated that the PE teachers participated in self-directed online CPD for professional reasons, including the ability to access instructional resources to develop their teaching practices and network with other teachers to obtain social support. Interestingly, the self-directed online CPD environment met the needs of teachers who felt isolated in their school contexts, and the online environment was also a preferred learning method for PE teachers who struggled to engage with face-to-face learning (Kim, 2003; Lee & Kim, 2010). These findings build on previous studies conducted with other online tools, such as social media (e.g., Twitter; Goodyear et al., 2014; Goodyear et al., 2019; Harvey & Hyndman, 2018; Willet, 2019), and further highlight the value and importance of online PE-CPD in the lives and careers of the current generation of PE teachers.

Based on the data generated and reported, the findings demonstrate how the MIM-based online PE-CPD was representative of an established group of teachers (MacPhail et al., 2014). Similar to CoPs and the notion of a shared repertoire, there was evidence that different teacher participants had different roles that contributed to the overarching aim of the chatroom, which is to offer professional development. There was also a sense of legitimate peripheral participation as teachers were invited to join the chatroom and moved from being newcomers into one of the engagement pattern roles. As for guideposts supporting the success of online PE-CPD, there was evidence of expressions of gratitude and recognition from other teachers and of social support, which is similar to the findings from studies of off-line CPD (Parker et al., 2012). However, a key limitation of the established group was that there was no system to verify the quality of information in the chatroom because teachers were reluctant to

mention the quality of information in the many-to-many online chatroom (Jensen & Helles, 2011). This lack of verification of information can be considered a serious roadblock because there is no way to identify whether posted resources are the original creation of uploaders or material obtained from other teachers, or whether they reflect evidence-based knowledge. Another barrier and a potential roadblock is the shame and embarrassment experienced by passive uploaders given that the establishment of trust and a safe but challenging learning environment (Patton & Parker, 2017) is essential to professional learning community. Similarly, requester teachers were concerned about revealing their weakness in the chatroom thus practiced a high level of self-censorship.

The analysis of the data in relation to the framework proposed by MacPhail et al. (2014) and concepts related to facilitation, success, and potential further illustrate that the MIM was an established group. Firstly, the chatroom was facilitated by the ringmasters, who set the norms of the online community and encouraged the exchange of ideas. Previous research, however, suggests in addition to providing the basic communication structure and encouraging active and positive communication between participants, facilitators should provide thoughtful and in-depth questions to guide teachers' reflections if they are to support impacts on learning and practice (Patton, Parker, & Pratt, 2013). Although some pedagogy of facilitation strategies identified from formal offline CPD programs can be beneficial, the nature of massive online CPD requires specific strategies relevant to the online environment. Secondly, and in relation to the concept of success, evidence from the MIM participants highlights that the MIM had an accomplished objective, and that different members of MIM supported empowerment. For example, there was a clear shared purpose that engagement in MIM was for CPD, and that sharing resources was a central mechanism of learning and supporting other MIM participants. Thirdly, in relation to potential, the data suggest that the MIM groups were at an intermediate phase of changing isolated classroom practices and change in school culture and PE. There was evidence of both in the data sets, and further in-

depth data collected over a sustained period of time could have provided more definitive answers on the positioning of success in relation to the framework. For these reasons and because of the factors related to success, guideposts, roadblocks, facilitators, and potential the chatroom is conceptualized as an established group.

Building on the theoretical framework of PLCs, grounded in situated learning theories (see McPhail et al., 2014), the data generated from this study elucidate the importance of a better understanding of the notion of bystanders (or "lurkers;" see Goodyear et al., 2019): those who engage passively and do not actively interact within communities (Table 2). Furthermore, lurking and the behaviors of the bystander participants (Table 2) are particularly important to understand within Korean culture, where teachers often avoid standing out and refrain from asking questions because these actions can be considered a sign of weakness. The "vicarious response" is a prevalent aspect of the culture among Korean teachers and is a way to maintain harmony within a group by withholding individual opinions (Lee & Kim, 2010). However, many of the concepts across theoretical frames focus on the relationship between learning and interactions, with a lack of interaction (or active participation) often associated with limited engagement and, in turn, little or no impact on learning and practice. Furthermore, bystanding or lurking is often perceived in a negative sense as indicating a lack of a willingness to learn and contribute to the community. Data from this study, however, challenge how we conceptualize the relationships between interaction and learning in online communities for passive participants. It was evident in the data that bystander teacher participants were contributing to the goals of the community although their level of learning cannot be assumed and was not a focus of this study. Therefore, it seems that different metrics and concepts should be used to measure bystanders' engagement and learning, and in ways that focus on more passive forms of engagement, with such concepts likely to challenge the social constructivist/situated learning perspectives that are often used to explain community-based approaches.

Conclusion

This study examined PE teachers' participation patterns within self-directed online PE-CPD activities using MIM. The online environment comprised different groups of teachers who had different motivations and needs for professional development. It showed the potential for the rapid exchange of ideas and resources and for controlling the degree of participation based on the different needs and motivations of different teachers. In addition, the emphasis on speed rather than quality of information, the pursuit of quick fixes rather than the exchange of critical discourse and reflection, replicated the individualistic school cultures in offline contexts (Lee et al., 2019). Accordingly, this study builds on established features of effective CPD in general (c.f. Darling-Hammon et al., 2017) and in PE-CPD (Armour et al., 2017) by illustrating them in an online context.

The findings of this study have the following implications for future online-based CPD research. First, this study only examined teachers' engagement patterns with a single year of data and the five engagement patterns identified in this study can be transient rather than static; future studies should explore how the roles and functions of individual teachers change over a longer term. Tracking the engagement patterns of individual teachers over a long period will provide insights into how teachers are learning and growing within the online environment.

Second, studies on the spillover effects of self-directed online PE-CPD should be explored. Although the majority of participants may remain silent, the ideas exchanged in the online environment can be a catalyst for their self-reflection, or serve as seed beds for small group online communities and/or offline teacher learning communities. These studies will provide information on the impact and influence of self-directed online CPD on teachers' professional development beyond online communication.

Finally, given that this study only examined how and why teachers are participating in self-directed online CPD, future research should explore how this participation influences

teachers' changes in knowledge and practices as well as student learning outcomes. Specifically, teachers' changes and the impact on student learning should be examined in relation to teachers' participation patterns because different groups of teachers have different ways of learning and participating. Such research will inform researchers and practitioners in developing facilitation strategies tailored to each group of teachers to maximize teachers' learning and student learning outcomes.

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References

Armour, K., & Makopoulou, K. (2012). Great expectations: Teacher learning in a national professional development programme. *Teaching and Teacher Education, 28, 3*36-346.

Armour, K.M., Quennerstedt, M., Chambers, F., & Makopoulou, K. (2017). What is 'effective' CPD for contemporary physical education teachers? A Deweyan framework. *Sport, Education and Society*, *22*, 799–811.

Atencio, M., Jess, M., & Dewar, K. (2012). "It is a case of changing your thought process, the way you actually teach.": Implementing a complex professional learning agenda in Scottish physical education. *Physical Education and Sport Pedagogy, 17,* 127-144.

Blitz, C. L. (2013). *Can online learning communities achieve the goals of traditional professional learning communities? What the literature says.* (REL 2013–003). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Mid-Atlantic. Retrieved from http://ies.ed.gov/ncee/edlabs.

Calderón, A., MacPhail, A., & Meroño, L. (2019). A student-centred digital technology

approach: The relationship between intrinsic motivation, learning climate and academic achievement of physical education pre-service teachers. *European Physical Education Review, 26*, 241–262.

Carpenter, J. P., & Krutka, D. G. (2014). How and why educators use Twitter: A survey of the field. *Journal of Research on Technology in Education*, *46*, 414–434.

Corbin, J., & Strauss, A. (2008). *Basics of qualitative research: Techniques and procedures for developing grounded theory*. Los Angeles, CA: Sage Publications.

Cordingly, P., Higgins, S., Greany, T., Buckler, N., Coles-Jordan, D., Crisp, B., & Coe, R. (2015). *Developing great teaching: Lessons from the international reviews into effective professional development*. London, UK: Teacher Development Trust.

Cushion, C., & Townsend, R. (2018). Technology-enhanced learning in coaching: A review of literature. *Educational Review*, *71*(5), 1–19.

Darling-Hammond, L., Hyler, M. E., Gardner, M. (2017). *Effective teacher professional development*. Palo Alto, CA: Learning Policy Institute.

de Vries, S., Jansen, E. P., & van de Grift, W. J. (2013). Profiling teachers' continuing professional development and the relation with their beliefs about learning and teaching. *Teaching and Teacher Education, 33*, 78–89.

Gleddie, D., Feith, J., Howe, P. D., Larsson, H., Cale, L., & Casey, A. (2016). Joey: Social media as a tool for professional development. In A. Casey, V. A. Goodyear, & K. M. Armour (Eds.), *Digital technologies and learning in physical education: Pedagogical cases* (pp. 121–136). Abingdon, Oxon: Routledge.

Goodyear, V.A. (2017). Sustained professional development on cooperative learning: Impact on six teachers' practices and students' learning. *Research Quarterly for Exercise and Sport*, *88*, 83–94.

Goodyear, V. A., Casey, A., & Kirk, D. (2014). Tweet me, message me, like me: Using social media to facilitate pedagogical change within an emerging community of practice. *Sport,*

Education and Society, *19*, 927–943.

Goodyear, V.A., Parker, M., & Casey, A. (2019). Social media and teacher professional learning communities. *Physical Education and Sport Pedagogy, 24*, 421–433.

Greenhow, C., & Lewin, C. (2016). Social media and education: Reconceptualizing the boundaries of formal and informal learning. *Learning, Media and Technology, 41*(1), 6–30.

Groundwater-Smith, S. (2017). *From practice to praxis: A reflective turn: The selected works of Susan Groundwater-Smith*. London, UK: Routledge.

Harvey, S., & Hyndman, B. (2018). An investigation into the reasons physical education professionals use Twitter. *Journal of Teaching in Physical Education*, *37*, 383–396.

Hodge, K., & Sharp, L. A. (2016). Case studies: What are they?. In B. Smith & A. C. Sparkes (Eds.), *Routledge handbook of qualitative research in sport and exercise* (pp. 62–74). Abingdon, Oxon: Routledge.

Jensen, K. B., & Helles, R. (2011). The internet as a cultural forum: Implications for research. *New Media & Society, 13*, 517–533.

Kim, B. (2003). A qualitative case study on the middle school teachers' cultures of the teaching profession. *The Journal of Educational Administration, 21*(1), 1–28.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation.* Cambridge, UK: Cambridge University Press.

Lee, J., & Kim, B. (2010). A qualitative case study on the same grade teachers' culture in the middle school. *Journal of Research in Education, 36,* 81–110.

Lee, O., Choi, E., Griffiths, M., Goodyear, V., Armour, K., Son, H., & Jung, H. (2019). Landscape of secondary physical education teachers' professional development in South Korea. *Sport, Education, and Society, 24*, 597-610.

Lee, O., Choi, E., Son, H., & Lee, W. (2018). Characteristics of secondary physical education teacher's voluntary professional development activities - Focusing on activities other

than formal teacher training courses. *Korean Journal of Sport Pedagogy*, *25*(1), 1–23.

MacPhail, A., Patton, K., Parker, M., & Tannehill, D. (2014). Leading by example: Teacher educators' professional learning through communities of practice. *Quest, 66*, 39–56.

McKee, H. A., & Porter, J. E. (2009). *The ethics of internet research: A rhetorical, case-based process (Vol. 59*). New York, NY: Peter Lang.

O'Sullivan, M., & Deglau, D. (2006). Principles of professional development. *Journal of Teaching in Physical Education, 25*, 441-449.

Parker, M., Patton, K., & Tannehill, D. (2012). Mapping the landscape of communities of practice as professional development in Irish physical education. *Irish Educational Studies, 31*, 311–327.

Patton, P., & Parker, M. (2017). Teacher education communities of practice: More than a culture of collaboration. *Teaching and Teacher Education, 67*, 351-360.

Patton, P., Parker, M., & Pratt, E. (2013). Meaningful learning in professional development: Teaching without telling. *Journal of Teaching in Physical Education, 32*, 441–459.

Smith, B., & McGannon, K. (2018). Developing rigor in qualitative research: Problems and opportunities within sport and exercise psychology. *International Review of Sport and Exercise Psychology*, *11*(1), 101–121.

Tang, Y., & Hew, K. (2019). Examining the utility and usability of mobile instant messaging in a graduate-level course: A usefulness theoretical perspective. *Australasian Journal of Educational Technology, 35*(4), 128–143.

Vangrieken, K., Meredith, C., Packer, T., & Kyndt, E. (2017). Teacher communities as a context for professional development: A systematic review. *Teaching and Teacher Education*, 61, 47-59.

Yoon, K., & Armour, K. (2017). Mapping physical education teachers' professional learning and impacts on pupil learning in a community of practice in South Korea. *Physical Education and Sport Pedagogy*, *22*, 427–44.

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634 Table 1. In-depth interview participants' background information

Category		**Number**
Gender	Male	6
	Female	4
Academic degree	Bachelor's	5
	Master's	5
Teaching experience	1–5 years	4
	6–10 years	2
	11–15 years	3
	16 years ~	1

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639 Table 2. Styles of physical education teachers' participation in MIMs

Participation styles		Chatroom behaviors	Number of teachers (%)	Number of messages posted by teachers (%)
Ringmasters		Creates and manage the chatroom	2 (0.3)	409 (7.8)
Uploaders	Active	Voluntarily uploads material in the chatroom without request from other teachers	53 (7.7)	2,402 (45.8)
	Passive	Uploads material when requested by another participant	56 (8.2)	1,731 (33)
Requesters		Asks questions and requests material from other teachers	170 (24.9)	704 (13.4)
Bystanders		Presents in chatroom but makes no comment	403 (58.9)	0 (0)
Total			684 (100)	5,246 (100)

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